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# THE NEW GEOPOLITICS OF ENERGY

By Carlos Pascual

SEPTEMBER 2015

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By Carlos Pascual*

**SEPTEMBER 2015**

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# EXECUTIVE SUMMARY

Energy and geopolitics have always been closely linked. The twentieth century saw access to energy resources become a major factor in determining the winners of wars, oil producers banding together to create new global alliances, and price swings that spurred or deterred the adventurism of superpowers. The vast and fast-paced changes in the energy sector in the twenty-first century are rewriting the relations between the two fields.

As new resources are made available and create new geopolitical tools and opportunities, and as climate issues move to the fore of the global agenda, too little work has been done to create a clear map that enables policy makers, industry, and the public to navigate the new issues arising at the nexus of energy and geopolitics. This is especially true in the United States, which, due to its emergence over the past decade as a major hydrocarbons producer and exporter, has found itself with powerful new leverage to advance its agenda globally. How and when to advance this power, whether through intervening in energy markets or otherwise, will be a thorny issue that will require analysis across difficult and rapidly changing pieces. These include understanding the shifts in global energy demand, the diversification of oil supplies and new risks of disruption, the growing competition in global gas markets and its relation to energy security, the incentives for power investment globally and the implications for climate change, and the thirst for energy access and its consequences. Managing these issues will require investment in new human capacity, similar to the investment made during the Cold War to avoid nuclear disaster.

This paper provides a framework to understand the relationships between energy geopolitics and energy markets. An underlying premise of this paper is that neither energy markets nor foreign policy are static. Thus, to understand how energy markets and foreign affairs intersect, we have to understand the dynamics between the two. Strong national policies require us to understand how nations might influence energy markets and how radical change in energy markets affects the national interests of countries. In addressing the two together, this paper provides a new analytic foundation for governments and the private sector to assess how investment decisions and government policy will influence national security, economic growth, and environmental sustainability.

Key findings from the report include:

• While America's new oil and natural gas abundance may hold the allure of allowing it to adopt a more isolated position in global energy markets, this will ultimately not serve its national security interests. Energy markets are becoming more global, and the United States cannot isolate itself from price movements that have a direct impact on the US economy. From a political and environmental standpoint, the United States has an interest in seeing investment in sustainable energy solutions. A policy of isolationism would also forgo the drivers—open markets and entrepreneurship—that sparked the American energy revolution to begin with.

• The United States, like other major energy producers in the past, has used its newly tapped energy resources to support its international objectives. However, interfering with markets can come with unintended consequences that can ultimately undermine the interests of the United States and its international partners. The "Rules of Six" outlined within this paper set up a framework for policymakers to evaluate interventions in a way that helps ensure they are successful.

• US policymakers must have a better understanding of how changes in global energy markets impact the nation's interests, including the current shifts in global energy demand, the diversification of oil supply sources and the increased competition in global gas markets, the incentives for power investment across nations and the implications for climate change, and the need to increase energy access globally and the repercussions for failing to meet that demand.

• If nations see stopping climate change as a key foreign policy and national security concern, then the financial and technical factors driving these investment trends must become a priority at the intersection of energy markets and geopolitical interests. To succeed, the United States and other nations must integrate finance experts, energy developers, engineers, climate scientists, and foreign policy specialists into the debate. At the same time, tackling the challenge of universal access to energy will require leaning heavily on business models in addition to technical solutions.

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# INTRODUCTION

Energy and geopolitics have always been closely linked. The twentieth century saw access to energy resources become a major factor in determining the winners of wars, oil producers banding together to create new global alliances, and price swings that spurred or deterred the adventurism of superpowers. The vast and fast-paced changes in the energy sector in the twenty-first century are rewriting the relations between the two fields. As new resources are made available and create new geopolitical tools and opportunities and as climate issues move to the fore of the global agenda, too little work has been done to create a clear map that enables policy makers, industry, and the public to navigate the new issues arising at the nexus of energy and geopolitics.

This is especially true in the United States, which, due to its emergence over the past decade as a major hydrocarbons producer and exporter, has found itself with powerful new leverage to advance its agenda globally. How and when to advance this power, whether through intervening in energy markets or otherwise, will be a thorny issue that will require analysis across difficult and rapidly changing pieces. These include understanding the shifts in global energy demand, the diversification of oil supplies and new risks of disruption, the growing competition in global gas markets and its relation to energy security, the incentives for power investment globally and the implications for climate change, and the thirst for energy access and its consequences. Managing these issues will require investment in new human capacity, similar to the investment made during the Cold War to avoid nuclear disaster.

Evidence of the new questions facing the United States in energy policy abound. In February 2012, I gave my first address to the Beijing Energy Club, which was attended by more than one hundred participants from China's energy sector elite drawn from government, energy companies, academia, and the Communist Party. My point was simple: the world is undergoing a revolution in energy technologies that is allowing the United States, and perhaps the world, to extract resources and generate energy in ways that have taken us from a dooming sense of scarcity to the prospect of greater security and economic growth. If done well, we can also accelerate a global shift to cleaner fuels. The first question from the audience would dominate the discussion: Will the United States continue to invest in peace and stability in the Middle East and the security of sea transit given the new abundance of oil and natural gas production in the United States?

The same question reverberates in the US military and among Congressional appropriators. With the reemergence of the United States as a major producer of oil and natural gas, could the United States change its military posture in the Middle East and reduce investments in patrolling and securing global sea lanes? Energy abundance might be a ticket to selective isolationism, saving the United States billions in military expenditures.

Fast forward to March 2014. Russia has annexed Crimea and started to foment an insurgency in eastern Ukraine. IHS/CERA is sponsoring one of the largest global energy conferences in Houston.[1] The first question to arise in my interviews with the press: Can the United States use its newfound energy abundance to export liquefied natural gas (LNG) to Ukraine and free Ukraine and Europe from their dependence on Russia? By December 2014, as oil prices approached a three-year low of $60–65 per barrel, further speculation erupted: Has the United States banded with Saudi Arabia to flood oil markets, drive down prices, and bring the Russian economy to its knees? Conventional wisdom had shifted from viewing energy as a tool of isolationism to using it as a blunt weapon of economic warfare that was highly effective in hurting foes, supporting friends, and enforcing American interests.

Both examples make a core mistake: divorcing energy geopolitics from energy markets. Oil and, increasingly, gas are traded in global markets. These markets, perhaps with regional variants, set prices that are based on supply and demand and tempered by perceptions of risk. Perhaps the actions of one or groups of countries can affect prices; however, no one country can isolate itself permanently from market impacts. Disruptions in supply anywhere in the world will affect energy prices and economic growth—in the United States and globally. In the early 1980s, the OPEC countries found that sustained high oil prices crippled global growth and eventually destroyed demand for oil.

Further, the ability to wield energy as a tool depends on the ability to mobilize and sustain massive quantity

flows over time. Flood oil markets with supply in the short term; and, if the market reads that suppliers cannot maintain the flows, speculators will purchase the cheap supplies and reap the windfalls when prices rise. Sanctions on commodity exports can cripple a regime, but only when nations have the capacity to sustain the sanctions and compensate for supply losses so that those imposing the sanctions do not lose from higher prices. Even with renewable energy and energy efficiency, markets and not goodwill to arrest climate change largely determine the path of investment. Capital flows to projects that deliver the best rates of return.

This paper provides a framework to understand the relationships between energy geopolitics and energy markets. It is divided into three parts. Part one of the paper addresses the fundamentally new foundations for global oil and gas supplies that stem from the unconventional energy revolution in the United States. This vast expansion in supply has driven much of the speculation on the use of energy as a geopolitical tool. Part two of the paper addresses the prospects and limits for countries to use energy as an instrument to advance their geopolitical interests. It introduces a new analytic framework called the Rules of Six to help policy makers and market players understand when—and how—countries can influence energy supplies in ways that can eventually affect the political and economic interests of countries, as well as the policy choices that they make.

Part three of this paper reverses the perspective on geopolitics and energy. Rather than ask whether geopolitical interests can influence energy markets, it assesses the vast changes emerging in the types, costs, and scales of energy supply and demand and asks how these trends could influence national policies and geopolitical interests. In effect, part three argues that changing energy markets are creating a new geopolitical landscape that affects the national security interests of all countries. These changes in energy markets range from unprecedented new sources of oil and gas supply, to the competitiveness of renewable energy and lower carbon fuels, to whether or not countries have access to energy. All these factors influence the relative strengths, weaknesses, and stability of international players and, in some cases, regions (e.g., the Middle East) and continents (e.g., Africa).

An underlying premise of this paper is that neither energy markets nor foreign policy are static. Thus, to understand how energy markets and foreign affairs intersect, we have to understand the dynamics between the two. Strong national policies require us to understand how nations might influence energy markets and how radical change in energy markets affects the national interests of countries. In addressing the two together, this paper provides a new analytic foundation for governments and the private sector to assess how investment decisions and government policy will influence national security, economic growth and environmental sustainability.

# AMERICA'S OIL AND GAS REVOLUTION

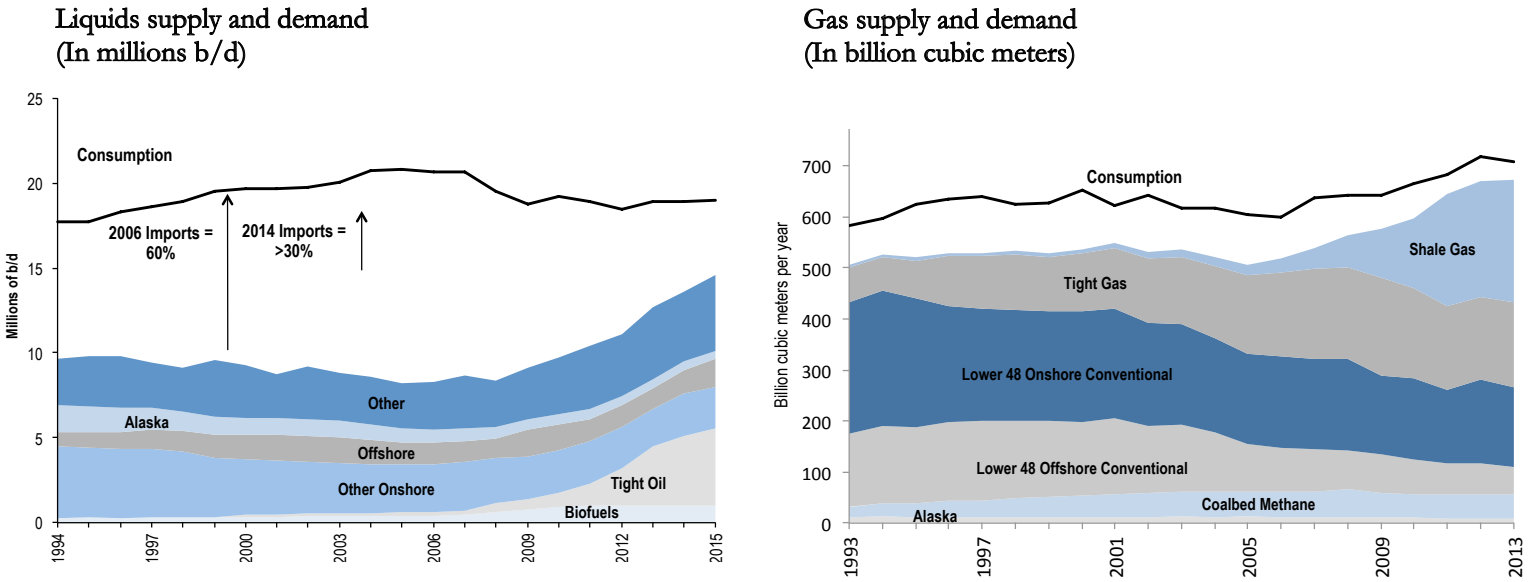
The United States has radically increased the production of oil and gas in the past five years. Entrepreneurial talent, technology, good infrastructure, private capital and a predictable legal environment have, combined, enabled an almost unique environment to revolutionize the production of hydrocarbons.[2] In the last three years, the United States has added more than another Kuwait, UAE, Mexico, or Nigeria to global oil supplies. From 2008 to 2013, while US GDP growth averaged 1.2 percent per year, economic output in the oil and gas industry grew four times faster, at 4.7 percent. Over the same period, total US employment declined by 0.1 percent, while oil and gas industry employment grew 4.3 percent per year. More broadly, the revolution in "unconventional" oil and gas has been one of the major contributors to the US economic recovery, adding nearly 1 percent to the US GDP annually, on average, over the past six years—accounting for nearly 40 percent of overall GDP growth in that time.[3]

## ENERGY ABUNDANCE

Since 2008, the United States has increased its oil production by 4.1 million barrels per day, an increase of 81 percent.[4] In 2014, the United States became the largest producer of liquid fuels in the world.[5] Further, measures to promote vehicle efficiency, combined with economic contraction after the 2008 recession, reduced oil consumption by almost 10 percent from its peak in 2006. The result has been that the United States reduced its oil imports as a percentage of consumption from about 60 percent in 2006 to 27 percent in 2014.[6]

In natural gas, the United States is on track to be a net exporter by 2020, largely due to the shale gas revolution.[7] The ability to combine horizontal drilling with hydraulic fracturing (fracking) to release gas from rock; and, more recently, the application of information technology to reduce fracking costs have driven shale gas production from 1 percent of US supply in 1999 to about 40 percent in 2014.[8] The Energy Information Administration (EIA) estimates that technically recoverable resources could potentially last another ninety-two years.[9]

**Figure 1: US oil and gas production**




Source: EIA Short Term Energy Outlook 2014.

These trends toward oil and gas abundance pictured in Figure 1 have driven speculation on how the United States can change its role in global energy markets—from selectively withdrawing from protecting global security to using newfound energy wealth to intervene strategically in defense of American interests. Such speculation about using energy either as a security tool or a protective shield needs to be matched against geopolitical reality: American interests are not episodic. US foreign policy is best advanced when our intentions and actions are clear and consistent and respectful of international law. Sporadic engagement or use of pressure neither inspires trust nor produces results. That is not to say that the United States or other major suppliers should never intervene in energy markets to advance their interests, but doing so successfully requires a much clearer understanding of the wider political context, long-term policy goals, and the ability to sustain influence upon energy markets.

## ENERGY SECURITY VERSUS ISOLATION

What is certain is that the American energy revolution has made the United States more energy secure based on the fundamentals of energy security:

- availability (are supplies on the market?);
- accessibility (can you get to them?); and
- affordability (can you get them at a competitive price?).[10]

There is no question that oil and gas are more available to American consumers in 2015 than in the past decade. Oil and gas production have grown, respectively, 81 percent and 35 percent in the past five years.[11] Domestic growth means that supply is largely accessible, despite pipeline transit constraints within the United States.[12] Further, Canada is the leading oil exporter to the United States, and in 2014 Mexico was third, meaning that most of the oil the United States consumes comes from North America.[13] America's energy abundance, supply growth in Canada, and the potential for growth under Mexico's reforms to drive private investment in hydrocarbons not only point to potential oil and gas self-reliance in North America by 2035, but also make North America a hub for stability in energy markets that is founded on private-led growth and political stability in democratically elected states.[14]

The massive increase in American energy supplies has also profoundly affected the politics of global oil; and, in 2014–2015, caused a massive collapse in international oil prices that has driven OPEC into hibernation.[15] From mid-2011 to mid-2014, the Brent international crude oil benchmark price hovered in the range of $105–110 per barrel. By December 2014–August 2015, the Brent international benchmark floated between $45 and $65 per barrel.[16] In part, perceptions of market risk changed—from a fear of political and security disruptions of international supplies to a fear that disrupted barrels from countries such as Libya, Iraq, and Iran might find their way back to markets when increases in American production outpaced global demand.[17] In part, Saudi Arabia, Kuwait, and the Emirates decided they could no longer stabilize international prices by adjusting supply; and, on November 27, 2014, opened a historic moment in oil markets by declaring that OPEC would let market supply and demand drive global oil prices.[18] This collapse in oil prices will flatten the growth of US oil supply in 2015–2016, but analysts have found the potential for American unconventional production to remain resilient given changes in technology and the capacity to better target capital expenditures to productive assets.[19] The 2014–2015 oil price collapse may force significant restructuring in the energy industry as low prices enforce discipline, but it will not set back American advances in making oil more available to US markets.

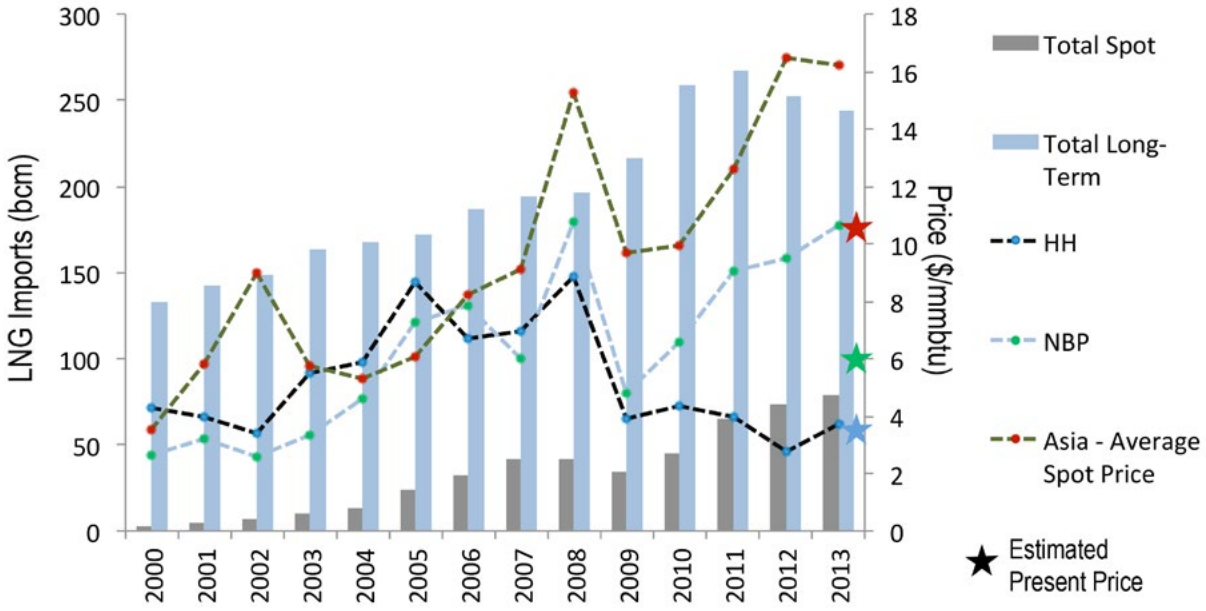
In the short run, this collapse in oil prices has made oil more affordable to consumers globally, but it does not mean that the United States can separate itself from international markets. Oil is traded globally as a commodity, and prices are global. The United States has been a leader during Republican and Democratic administrations in its quest for the elimination of fossil fuel subsidies around the world, as subsidies drive increased use of hydrocarbons and further exacerbate climate change. In the absence of domestic subsidies, consumers pay global prices for oil and refined products like gasoline and diesel. When market disruptions, scarcity and political instability drive up global oil prices, American consumers face these increases. Aside from US interests in Middle East peace, our alliance with Israel, and the potential reverberations of unchecked Islamic extremism in the Middle East and globally, there is also a sharp security cost to isolationism. About 85 percent of the oil going through the Strait of Hormuz goes to Asia, and it would be unrealistic to think

that China would not accelerate its investments to develop a deep-sea fleet to protect transit if the United States does not.[20] Ceding transit security in Asia would have deep strategic implications across the region that go far beyond who pays the bills.

Beyond security considerations, the United States benefits economically from promoting stability in the Middle East and energy transit lanes across the world. Instability carries with it political risk and potential disruptions that increase oil prices and dampen American economic growth. Each 10 percent decrease in the global price of oil drives a 0.2 percent increase in global GDP.[21] Perhaps the irony for the United States is that American consumers pay global oil prices; but, as a nation, we cannot export crude oil when there are regional US surpluses. Due to oversupply of lighter crude types along the Gulf Coast and in the northern Midwest, the United States would derive national value from exporting localized surpluses and importing heavier crudes that meet specific refining needs. Such flexibility to trade oil would move trapped surpluses to global markets, strengthen the US stance against resource nationalism in other countries, and contribute to a global market environment that promotes economic growth in the United States.

Natural gas prices present a complicated and regionally diverse story. As shown in Figure 2, natural gas prices began to diverge regionally in 2008, especially as key markets shifted from oil-indexed prices for gas toward gas-on-gas competition. In the United States, sharp increases in shale gas production drove prices down. In Europe, Statoil's aggressive incursion into gas markets and increased global LNG availability (as the United States reduced its LNG imports) both led to major shifts to gas-on-gas pricing. [22] Asia had the worst situation historically, as high oil-indexed prices and a very thin gas market drove prices higher after the 2011 Fukushima tragedy. Figure 2 also shows that, as LNG markets have become more liquid and supply has increased, LNG prices dropped across all regions in the summer of 2014—and then the 2014–15 oil price collapse drove down oil-indexed gas prices further in 2015. In the United States, increased gas production and falling production costs (with technology and efficiency gains) have largely made gas more affordable, despite price upticks in the winter of 2013 due to cold weather and pipeline constraints in parts of the northeast.

**Figure 2: Diverging gas prices, spot deals lead growing LNG trade**




Source: EIA, PIRA, GIIGNL. Spot cargos are defined as deals that are done for four years or less.

As US gas pipeline constraints are resolved, the question is whether domestic demand can absorb a growing and more easily accessible supply; and, if not, how far prices will fall before they erode the incentive to produce more gas. This assessment of demand, supply, and price is fundamental to the US decision to allow gas exports to international markets. As of August 2015, the Department of Energy (DOE) had approved 14 applications for natural gas exports to non-Free Trade Agreement countries that could total about 140 billion cubic meters (bcm) annually.[23] In reaching its decisions, DOE de facto determined that limiting production to US markets would produce US regional market gluts,[24] which would create a disincentive to US production. LNG exports will bring benefits to exporters and their supply chains. Beyond that, a global market will help sustain incentives for production; which, in turn, are key to securing availability and access. Production increases elsewhere will influence prices in key regions and globally, as well as affect demand for exports from the United States. The LNG trade is not as simple as the oil trade. For instance, it is more expensive to transit LNG than oil[25] and there are significant infrastructure and policy constraints to moving natural gas. Still, the incentive to respond to global and not just US demand will provide a strong price signal to producers.

Far from isolationism, in order to maintain gas security, the imperative for the United States is to understand the evolution of global and regional gas markets, to engage countries to bring more supply into markets to spark competition, and to advocate investments in infrastructure and policy that create competitive terms of trade that preclude regional monopolies. Isolationism would be a recipe to forgo the drivers—open markets and entrepreneurship—that sparked the American energy revolution to begin with.

# ENERGY AS A GEOPOLITICAL WEAPON?

Just as energy abundance is not a path to selective isolationism, we need to assess whether, when and how such abundance might justify using energy as an instrument of national security. The use of energy as a tool to influence neighbors and hurt enemies is not new or unique to the United States. One can argue whether such a precept is moral. If the alternatives are war, are otherwise ineffectual, or leave violations of international law unchecked, then energy policy should be used to protect national security interests. There have certainly been cases in which energy suppliers have used market dominance to coerce political and economic concessions from their neighbors. Right or wrong, it will happen again.

Most likely, nations will decide whether to wield energy as a national security tool based on their perceptions of whether doing so will succeed. Countries that try to use energy as a geopolitical weapon should understand their chances to produce the desired outcomes. Countries that are subjected to such tactics will inevitably try to circumvent the impacts. No analytic model can predict every outcome from political interventions in energy markets, but a systemic approach to understanding the potential risks and impacts may produce better outcomes. Ideally, decisions to intervene in markets would be well designed, misguided or unrealistic policies would not be implemented, and dangerous interventions would be more easily countered.

## FRAMEWORK FOR ANALYSIS: THE RULES OF SIX

This paper proposes a new analytic framework called the Rules of Six. The Rules of Six are not prescriptive. They build on six tactical interventions that capture most tools nations could use as an instrument of national security policy to intervene in energy markets. The Rules propose that any given intervention must be assessed against six market and institutional factors that will influence the desired outcome. No individual factor may signal success or failure. Taken together, these factors will inform whether a proposed intervention can achieve the scale and longevity, mobilize the market players, and convey the political and policy clarity necessary to achieve the intended impacts. Further, we should assume that countries affected by any intervention will use such a methodology to counter interventions against them. If used to test both sides of a market intervention and the geopolitical impacts, the Rules of Six provide a foundation for a cyclical approach to assess policy outcomes over time and whether they can be sustained.

The six market interventions are tactical options that can influence energy markets to serve national security interests. The first five tactics reflect the history of energy trade over the past century. The last tactic reflects the emergence of climate change as a foreign policy issue and the imperative to understand whether national and global climate policies will influence investment choices to increase the competitiveness of clean and renewable energy and energy efficiency.

- Block Exports: Most often, interventions to block exports manifest themselves as sanctions on a country's exports in order to deny that country markets and revenue. US and European sanctions on Iranian oil exports are, perhaps, the most prominent recent example.
- Constrain Production Capacity: Production from some countries is so large that blocking production would be hugely complicated, or curtailing production could raise global or regional prices and inflict equal or more pain on those imposing the sanctions. Instead, this intervention would block investment and trade, thereby affecting the future growth of the energy industry, as this could affect interest rates and the ability to finance budget deficits and corporate debt. This approach underpins current US and European sanctions on Russia.
- Flood Markets: A producer country, or countries, might use their capacity to flood markets in order to drive out new competitors, acquire market share, or punish others with a high stake in expanding market share. If energy-producing countries depend on an oil reference price to balance budgets, driving down the price of oil could have far-reaching impacts. Anti-dumping regulations were developed by the World Trade Organization to prevent such tactics in most commodity trade, but oil and gas trade are not included.
- Starve Markets: Dominant suppliers may try to use access to supply as a way to manipulate highly dependent customers with few options. Russia has such a dominant relationship over Ukraine, Bulgaria, the Baltic states, and Finland. If a country takes such an approach, it can jeopardize its international role as a

stable supplier. The Arab Oil Embargo in 1973 led consumers to counter the risk of market disruptions with the creation of the International Energy Agency. A comparable case would be to interdict supplies to a market, as occurred with Japan during World War II.

- Assist Friends: Targeted energy supplies or technical support to develop energy resources could help friends survive an emergency, build capacity for the future, and prevent others from taking advantage of transitional weaknesses. This was the rationale behind Congressional calls in 2014 to expand US LNG exports to Ukraine after the Russian invasion, even though exporting companies could not physically accelerate deliveries beyond contracted schedules. Another example has been Venezuela's use of Petrocaribe to subsidize fuel and win the allegiance of Caribbean nations.
- Change the Fuel Mix: Countries might use financial, technical, and diplomatic tools to get other nations to alter their fuel mix and make it more sustainable. Unless cleaner forms of energy production result in comparable rates of return as coal—which means lowering the cost or intermittency of renewables, pricing coal externalities, or both—then the future trend in China, India and Southeast Asia will be to expand coal generation, in many cases more quickly than renewables. Climate change negotiations may result in targets to reduce greenhouse gas emissions. The impact of those targets needs to be assessed against market incentives that will drive capital flows and investment choices.

The above tactics might succeed or fail based on six prevailing market factors, how countries incorporate these factors into their interventions, and how targeted countries use their knowledge and influence over their own markets to respond:

- Market Scale: Big interventions are always harder and riskier. The larger a producer's contribution to global or regional markets, the harder it will be to block its exports (e.g., Iran v. Russia in scale). The larger the consumer, the harder to starve the market. The smaller the region or country, the easier to support friends or influence investments that affect the fuel mix. The larger the economy, the harder to pivot on switching fuel choices.
- Investment Flows: Constraining a nation's production and exports of fuel requires curtailing investment flows into energy development. As long as there are contributions to production potential, increased productive capacity will find its way to market. Conversely, assisting allies will fail if they are not also aligned with investments that can change an underlying dependence on a specific supplier. Investment flows will fundamentally determine national energy infrastructure and climate impacts.
- Coalitions: Actions to intervene in markets will also create market opportunities to counter them. Coalitions with key public and private actors usually will be necessary to ensure that tactics to influence supply or capital flows are not simply circumvented. Countries need to collaborate so that sanctions on one country do not become another country's vehicle for increased competitiveness. In addition to national cooperation, banks and financial institutions have to be willing to cooperate. In all tactical areas, coalitions can accelerate desired outcomes, and the failure to maintain them can undermine the desired intent.
- Ability to Sustain: If there is a market intervention, countries must have the ability to sustain it for sufficient time in order to have a credible impact. Interventions seen as short-term will lead to speculation about their ability to have a lasting, strategic impact. Speculators will sweep in to gain from large supply injections. Meager support for friends could be counterproductive if the only long-term supply source is a predatory supplier.
- Speed: Alacrity in acting on stated goals is key to demonstrating seriousness of purpose. For example, President Vladimir Putin's judgment of a delayed and tepid response from the United States and Europe to inflict pain after annexing Crimea may have encouraged even further incursions into Ukraine. Interventions will be most effective when targeted countries have not had time to prepare against them. On fuel investment issues, delay in incentivizing cleaner options may entrench carbon-

intensive infrastructure alternatives.

- Self-Risk: Governments will assess possible sanctions and other interventions in energy markets vis-à-vis impact on national businesses. Immediately after Russia invaded Crimea, for example, Europe and the United States may have given greater weight to the impact of sanctions on their respective national companies than to the strategic significance of Russia's violation of Ukraine's sovereignty and territorial integrity. Nations must consider how interventions balance national security and commercial objectives and then assess whether the proposed tactics will achieve the desired impacts, not just whether those tactics remain domestically palatable.

To illustrate the complexity of successful interventions in energy markets, Table 1 presents the Rules of Six in a matrix of tactics and market factors. The complexity may seem daunting. One could complicate it further by assessing the probabilities for outcomes that each cell drives, and then combine probabilities across cells. We should draw two lessons from the matrix—successful interventions require deep and critical analysis, and one has to understand the full range of market and institutional factors associated with an intervention to assess the cycle of geopolitical reactions that it is bound to trigger. The premise behind the Rules of Six is that the framework will drive us to assess the right variables—and all of the critical variables. That can help governments develop better and more realistic policies to achieve their goals, as well as help both government and private actors predict and counter the impacts of actions taken by other nations. Such analysis also helps gauge second round effects of policy actions in what will inevitably be an interactive process as market players protect their own interests.

## THE RULES OF SIX IN PLAY: IRAN AND RUSSIA

Consider below how the Rules of Six apply to sanctions on Iran and Russia. The Rules underscore the need for different tactics. They help us understand strengths and weaknesses in actions taken, and vulnerabilities looking to the future.

European and American sanctions against Iran were intended to pressure Iran into negotiations to preclude it from gaining a nuclear weapon. The sanctions imposed in January 2012 denied entities importing crude oil from Iran access to European and American financial markets. Blocking imports from Iran was considered viable because Iran's share in global markets was relatively small: about 2.5 million barrels per day (b/d) in exports in 2011 relative to a market of about 89 million b/d.[26] These sanctions could have failed when oil prices shot up to $125/barrel in February–March 2012 and purchasers of Iranian oil all sought new suppliers in a short timeframe. Active discussions started in the United States and Europe and with the International Energy Agency to consider releases of strategic petroleum reserves. Oil prices began to fall in June 2012 as Saudi Arabia responded to market demand, and as US production—for completely unrelated reasons—added 1 million b/d to global supplies that year.

In that context, the United States convinced importers of Iranian oil to consider how overreliance on Iran could make them vulnerable. The United States invited these countries to diversify their supply. Every major importer of Iranian oil responded by cutting oil imports from Iran by 15–20 percent. India, for example, agreed to reduce its imports after a State Department team met with each Indian refinery that imported Iranian crude oil and reviewed its options for diversification. China made a national security decision to review the structure of its oil imports and further diversify supply. Turkey determined that sanctions would exclude its sole importer of Iranian crude from US financial markets and would entail greater costs than purchasing crude oil from other sources. At its peak, this coalition took 1.4 million b/d of Iranian oil off international markets. [27]

Table 1: The Rules of Six

| | Market Scale | Investment Flow | Coalitions | Ability to Sustain | Speed | Self-Risk |
|---|---|---|---|---|---|---|
| **Block Exports** | The smaller the producer, the greater feasibility without prohibitive market disruptions. | If investment still flows to the producer, ability to sustain a block on exports is unlikely. | Will major importers from the sanctioned producer cooperate? If not, then sanctions will be ineffectual. | Who is hurt more by market disruptions from imposing sanctions—the country sanctioned or those imposing sanctions? | Bold action facilitates impact and reduces ability to circumvent. How quickly can importers find alternative supplies? | Who balances the relative value of economic costs v. national security goals? What are the decision maker's core interests? |
| **Constrain Production Capacity** | Applicable to larger producers where industry comprises a significant share of GDP and budget revenues. | Assess capacity to limit financial flows to banks and curtail investment, finance, and trade for energy sector growth. | What entities have financial interests, and will they cooperate to block resources and technology to the sanctioned entity? | Does the sanctioned country or those imposing sanctions have more at stake? Which has greater will to bear costs? | Will sanctions be implemented rapidly to give credibility to political stance? Will those sanctioned feel an immediate cost? | Who balances the relative value of economic costs v. national security goals? What are the decision maker's core interests? |
| **Flood Markets** | Is the target a regional or global market? What scale of supply will have an impact? | Will flooding a commodity market also deter future investment in that market? | How many players are needed to accumulate supply? Will public and private actors cooperate? | How long can sufficient supply be mobilized to flood a market? Will speculators benefit from the windfall of low prices? | Can actions be taken immediately after policy decisions to mitigate market speculation? | If flooding a market does not achieve the intended aims, who will take the blame for the high resource cost and no impact? |
| **Starve Markets** | How large is the targeted market relative to accessible supplies from other sources? | Can the targeted entity secure financing to diversify production and cause the supplier to lose long-term market share? | Are there other potential suppliers to the market, and can they be brought into a coalition? | Is the consumer sufficiently large to make the cost of cutting supply prohibitive to the supplier? | Can measures be taken quickly to raise the cost of obtaining alternative flows from other suppliers? | What are short-term costs to entities forgoing exports? Who decides the relative value of forgone exports v. national security goals? |
| **Assist Friends** | What scale of support is needed to have impact? Can it physically get there? | Is it possible to mobilize capital flows in parallel to commodity aid to increase or diversify production? | Will key suppliers and transit countries cooperate? What risks do they face? | If assisting a friend, will that friend always be dependent on the entity, thus causing a problem? Are there long-term market alternatives? | Can supply or financing quickly reach the target and be maintained? Will action be judged as political or material? | How might private entities or nations retaliate against those supporting a friend? Where are the vulnerabilities? |
| **Change the Fuel Mix** | What are the major uses of coal and other fossils? How central are they to economy? | Can cleaner fuel investments compete on ROI and not just on price? | How to price coal externalities and reduce financing costs? | What are the risks to economic competitiveness and security of supply? | The longer the delay, the higher the cost to mitigate overall CO2 emissions in future. | Who balances economic, environmental, and national security costs? |

The combination of sanctions and the subsequent oil price collapse in 2014/2015 denied Iran on the scale of $5.7 billion a month, almost inevitably contributing to Iran's willingness to conclude on July 14, 2015 an agreement with the five permanent member of the UN Security Council plus Germany (known as the P5+1) to contain its nuclear program in return for sanctions relief. With oil prices roughly at $100 per barrel at the start of 2012 and Iranian oil exports at about 2.4 million barrels per day, Iran's oil revenue from exports was about $7.2 billion per month. The loss of 1.4 million b/d in exports alone accounted for a $4.2 billion loss in monthly revenue. With Brent oil prices falling from about $100 in 2012 to about $50 per barrel in the first quarter of 2015, Iran lost another $1.5 billion in monthly revenue. The IMF estimates that Iran needs $122 per barrel to balance its budget.[28] For Iran, it became imperative to return to international oil and capital markets. By 2015, US and European sanctions and international market developments had created the financial leverage that helped make possible the Joint Comprehensive Plan of Action, intended to reduce Iran's enriched uranium and centrifuges, redesign the heavy water reactor at Arak, allow for intrusive nuclear inspections, account for possible military dimensions of previous Iranian activities, and eventually allow for sanctions relief.

By the time this paper is published it should be clear if the US Congress rejects or approves the JCPOA, and if it is rejected, whether President Obama can sustain a veto. Many Republicans in the US Congress and some Democrats have objected to many elements of the JCPOA, particularly because it still allows Iran to maintain some form of military program. Some argue that tougher sanctions should be imposed in order to seek greater concessions.

The Rules of Six would suggest that the sanctions regime may have already reached its peak of influence, and that the P5+1 indeed concluded the JCPOA when their leverage was highest. With Iran having agreed on an international deal to limit its nuclear program, the moral authority to sustain support from China and Russia fades rapidly if the United States rejects the JCPOA. China, furthermore, has little to lose. China has isolated one trading company and one bank to handle commercial and financial transactions with Iran, and both are already under US sanctions. The European Union and the UN Security Council have also endorsed the JCPOA, suggesting that they would have little basis to enforce tighter sanctions. Iran, for its part, desperately needs oil revenues, and one should expect them to offer discounts to secure even limited revenue flows. China would be the first country to benefit by drawing on discounted oil to build its international reserves. If the United States rejects the JCPOA and seeks a tighter sanctions regime, it should expect to act alone, without the benefit of the coalition that made the 2012-2014 round of Iran sanctions succeed.

In contrast to Iran, European and American energy sanctions on Russia have tried to constrain production capacity rather than block exports because of the scale and importance of Russian supplies. Blocking Russia's 10.4 million b/d of oil exports would be physically unrealistic and would cripple global economic growth if it succeeded.[29] Blocking Russia's 160 bcm in annual gas exports to Europe would cripple European industry without a significant transition period to other suppliers; and, even then, gas prices would rise significantly.[30] Hence financial and economic sanctions on Russia targeted the future growth of the energy industry. Oil accounts for 70 percent of Russian export revenue, and oil and gas together comprise 52 percent of Russia's budget revenue.[31] Attacking the future expansion of oil and gas could increase the cost of financing Russia's budget deficit and, for companies, increase the cost of financing expansion or refinancing debt. When oil prices collapsed in 2014–2015, the combined impact of sanctions and reduced oil revenues had a more profound impact on the Russian economy than could have been anticipated when sanctions were first imposed. GDP growth slowed to 0.6 percent in 2014 and the Russian economy is projected to contract by 3.8 percent in 2015. Despite recent gains as oil prices have stabilized in May 2015, the ruble lost 50 percent of its value since October 2014.[32] Central bank benchmark interest rates increased from 5.5 percent in September 2013 to 12.5 percent in April 2015 and had reached a high of 17 percent in December 2014.[33]

The key flaw in the structure of sanctions on Russia has proved the slow speed in scaling up the sanctions relative to Russia's interventions in Ukraine, not the premise of the sanctions. The United States first promulgated a limited set of very weak sanctions on Russia in March 2014. Most were targeted to individuals and Bank Rossiya, the personal bank for senior Russian government officials.[34] By that point, Russia had already annexed Crimea, blocked responses through the United Nations Security Council and the Organization for Security and Co-operation (OSCE) in Europe, and started to foment insurgent groups in eastern Ukraine. The message to President Putin was clear: the West was more concerned about losing business in Russia than reprimanding him for his actions, and he had space to move further. Only in August 2014 did the United States

and Europe sharpen sanctions to attack the key areas of Russian energy expansion (shale, deep water, and the Arctic) and thus have a deeper impact.[35]

Delays in ratcheting up the focus and impact of these sanctions now complicate resolution of the crisis. Russia's economic elite may feel financial pain, but President Putin is wildly popular in Russia and is treating European and American counterparts as supplicants.[36] When German Chancellor Merkel and French President Hollande led the negotiations with President Putin and Ukrainian President Poroshenko on a ceasefire in February 2015, it is hard to imagine, in retrospect, that President Putin did not know that Russian-backed insurgents would violate the agreement days later.[37] While both Russia and Ukraine would gain from a solution that would stabilize Ukraine and allow Russia access to capital markets, at this stage President Putin has seemingly determined that the economic costs to Russia are not worth his political gains in projecting Russian power, destabilizing Ukraine, and de facto blocking Ukraine's integration with Europe. Tragically, perhaps, the only point of genuine Russian compromise came in early September 2014 when young Russian soldiers began to return home in body bags, momentarily puncturing President Putin's aura of invincibility and debunking the myth that Russia did not have troops in Ukraine.

The United States and Europe's inability to move quickly to align their national security interests over Russia's incursion into Ukraine with their economic interests in Russia may now bear significant cost to both. Although national security players saw a compelling need to block Putin, they demurred to trade and financial officials who prioritized economic costs, not fully understanding the national security risks. Consider, in contrast, the Powell Doctrine from the first Gulf War of 1991, which underscored the importance of entering a conflict with the ability to apply overwhelming force in order to control the battlefield.[38] Without similar strategic consideration in energy interventions about timing and scale, attempts to use markets to drive geopolitical outcomes could backfire or prove ineffectual, even when countries get the core national security assessment right in justifying the use of sanctions.

# MARKET SHAPES GEOPOLITICS

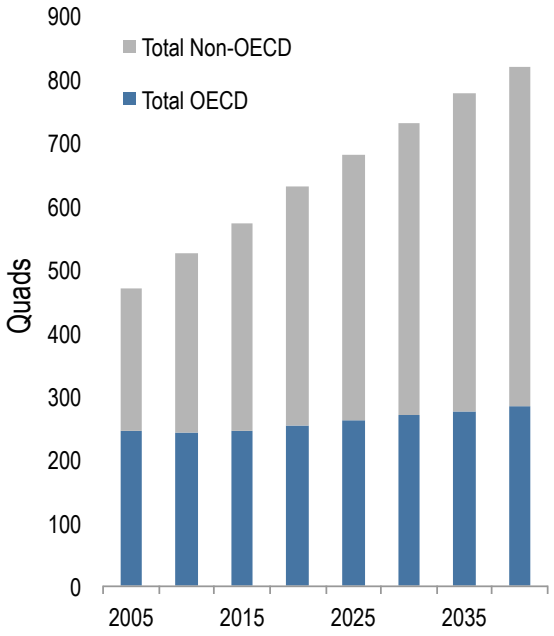
While the rise of US energy production has focused attention on how the United States might use energy as a geopolitical tool, arguably an even bigger issue in the geopolitics of energy has been how changes in global energy markets affect the rise of new actors and their geopolitical interests. Few countries produce enough energy to use it as a geopolitical tool, but the reverse is universal: energy affects the geopolitical interests of most every country. If we want to understand the geopolitics of energy, we need to understand how changing markets and market players affect nations, and not just whether and how nations have the capacity to intervene in energy markets. In part three of this paper, we explore the emergence of new market players and risks, and how these can affect national and global geopolitical interests.

## NEW CONSUMERS, NEW OPPORTUNITIES, NEW RISKS

No issue is more important than understanding the players who drive energy demand. They have changed from the rich nations in the Organization of Economic Cooperation and Development (OECD) to the emerging economies of non-OECD countries. For the first time, the non-OECD nations consumed more energy in 2006 than the OECD nations.[39] Figure 3 shows us that virtually all growth in energy consumption through 2040 will be in the non-OECD countries, and the biggest driver of that growth will be China. If we do not understand how the non-OECD countries obtain and use energy, we miss the driving market factor at the intersection of energy demand, economic growth, national security, and environmental sustainability.

The world of rich nations is just beginning to realize that it no longer dominates energy markets. Members of the OECD created the International Energy Agency (IEA) in 1973 in response to the Arab oil embargo in order to avoid another devastating oil shock to the world economy. Every two years, IEA energy ministers meet to guide the organization in its assessments of global energy trends and ensure that nations adapt to changing global energy realities. Joining the ministers as guests in the 2013 IEA ministerial meeting were representatives from Russia, China, India, Indonesia, Brazil, and South Africa. They were not vocal, but the meeting was about them. As IEA staff walked ministers through PowerPoint presentations on energy trends for the future, it became clear that the guests—not the hosts—would dominate future consumption and investment. As the largest and fastest-growing consumers, these guests will drive global oil and gas prices, determine dominant fuels and sources of power generation, shape consumer–supplier relationships, and determine whether nations can effectively arrest climate change.

**Figure 3: Total primary energy demand (Quads)**




Source: EIA 2013 IEO, IEA 2014 WEIO.

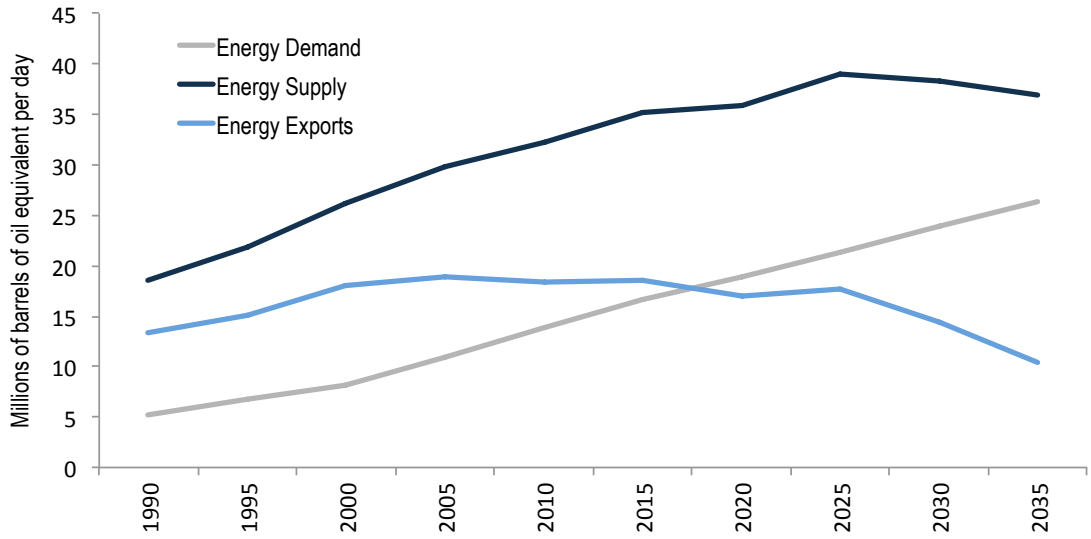
That meeting of IEA ministers kicked off the process of building an association between the IEA and non-OECD countries. Logic and self-interest would have made these key countries members. To do so, IEA members would have to amend their founding treaty and financial rules. Fearing gridlock as nations argued over influence and membership fees, ministers opted for a second-best solution: to create an asymptotic relationship with these seven nations, treating them as de facto members. A goal was set to complete the association in 2015. As of late 2014, the association process had stalled over how to treat Russia after its invasion of Ukraine and annexation of Crimea in 2014. With the IEA seeking a common approach with all potential "associates," the association process has

regressed to limited individual country partnerships where there are common interests.

This void in global energy governance and the energy interests of the world's fastest-growing energy consumers may not make most foreign ministries' top ten priority lists, but it should. Take China as an example. China will drive global oil consumption, and its ability to satisfy this demand will affect global oil prices and economic growth. Today, China gets most of its oil from the Middle East. Its strategy to diversify supply will shape its global economic engagement and attempts to exert influence throughout the world. That, in turn, will affect China's bilateral ties with key energy producers, Chinese votes in multilateral organizations, and Chinese investments to secure shipping routes to China. If there are major disruptions in global oil markets, it is impossible to achieve stability without the participation of major consumers. With Chinese power investment outstripping that of every other nation, China will—whether through its cooperation or obstinence—fundamentally shape global efforts on climate change.

The Middle East provides another drama in the evolution of consumer demand. We stereotypically associate the Middle East with infinite energy supplies. Middle Eastern energy producers treated energy as an abundant commodity domestically, subsidizing it for their populations to the point that little consideration was given to patterns or scale of consumption. Figure 4 shows us the energy subsidies that have driven Middle Eastern consumption. It also shows us a dangerous risk for global markets. Most Middle Eastern countries have used petroleum to generate electricity and desalinate water. Subsidized energy drove huge demand growth. If these trends continue into the future, they will strike a blow to oil exports from the Middle East, threaten the revenue base for every major Middle Eastern oil supplier, and undermine stability of oil supply in global markets. It is this fiscal threat that now drives Saudi Arabia to invest in a 40,000 MW solar development program and to develop its gas resources. The United Arab Emirates (UAE), meanwhile, has established a center of excellence on renewable energy and energy efficiency called the Masdar Institute. For the rest of the world, understanding these trends in the Middle East, extracting best practices to phase out energy subsidies, and promoting clean power alternatives should be part of any viable strategy on peace and stability in the Middle East.

**Figure 4: Fossil fuel production and exports in the Middle East (In millions of barrels of oil equivalent per day)**




Source: BP Statistical Review 2014, BP Outlook 2035, 2014, IEA World Energy Outlook 2013

Whatever country we live in, we are not used to thinking that another nation's energy consumption will affect the prices we pay for "our" gasoline, will affect our economic growth, and will shape which countries wield influence with energy suppliers around the world. The radical shift in energy demand outside of the OECD compels us to seek fundamental changes in energy governance to embrace the countries that will shape future energy demand. OECD nations need to integrate considerations of energy security, energy efficiency, and energy supply into foreign and national security policies—bilaterally and in regional and multilateral institutions. Yet, most nations have little capacity to manage this blend of technical, commercial, and national security issues. The United States has started by creating an Energy Resources Bureau in the State Department,[40] and other countries are creating special energy envoys. Just as it took time to create "fluency" in the language and practice of arms control during the Cold War and make arms control a mainstream foreign policy issue, however, it will also require training and investment in people to build skills that make it possible to bridge between energy markets and national security. A starting point is to understand the salience of the challenge.

## THE PROMISES AND RISKS OF DIVERSIFYING OIL PRODUCTION

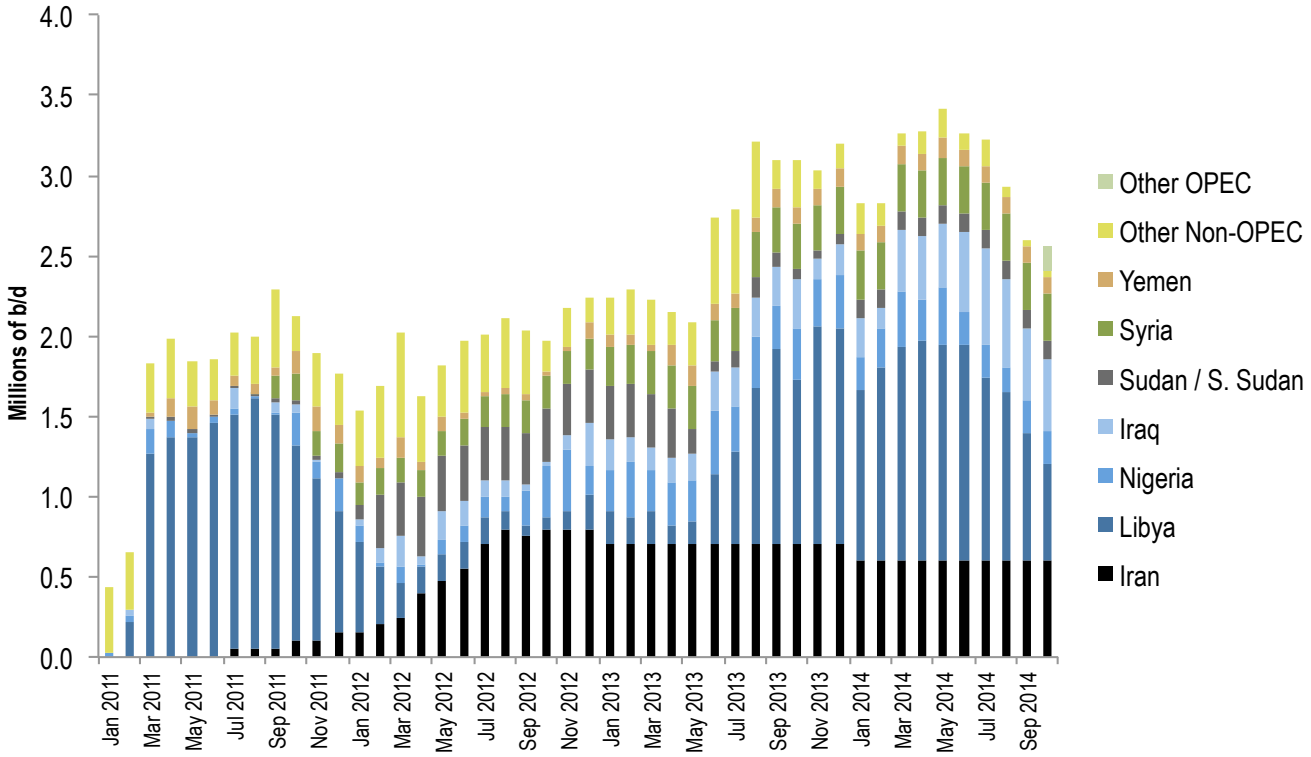
When the United States and Europe imposed their energy sanctions on Iran in January 2012, a major concern in implementing the sanctions was whether they would increase global oil prices, hurting importing consumers more than Iran. One of the unexpected heroes in implementing the sanctions was Iraq, which increased oil production from 2.6 million b/d in November 2011 to 3.2 million b/d at peak points in 2012. Iraq's stabilizing role would change two years later, in June 2014, when the Islamic State of Iraq and Syria (ISIS) seized swaths of northern and western Iraq, driving up Brent crude oil from about $105/barrel to $117/barrel. How should we judge the expanded reemergence of Iraq in global oil markets—as a welcome addition to supply, or a source of risk?

Answering this question is at the heart of another aspect of energy geopolitics. Will nations understand the points of vulnerability in global energy markets and work with those countries to unblock constraints to production, or at least prepare for disruptions in the market? Or will nations simply react to market developments, assuming there is little they can do to prevent or mitigate risk? Without a doubt, oil and capital markets assess and price these risks and affect economic growth, and rising oil prices will inevitably affect gasoline prices and make headlines in national politics. Yet, most nations are at a nascent state in their ability to integrate assessments of energy markets into preventive diplomatic action and long-term national security strategy.

Iraq's energy production became a positive story in 2012 because of partnerships: between the governments of the United States and Iraq, and between these governments and the private sector. In November 2011, Energy Deputy Secretary Dan Poneman and I were tasked by the White House to assess the problems affecting Iraq's ability to increase its oil production and to start a process to address the bottlenecks. Two sets of interlocutors were critical: Iraqi Deputy Prime Minister Hussein Shahristani and Oil Minister Abdul Karim Luaibi, and private energy companies working in Iraq's south. Dan and I flew over the southern oil fields, met with companies, and heard the concerns of dysfunctional pumping stations, including lack of pipeline capacity, lack of port capacity, and delays in payment and visa approval. We turned those complaints into an operational work plan with Deputy Prime Minister Shahristani. Many of the problems were known, but implementation lagged. Shahristani agreed to meet again in April 2012 to assess progress. By then, new single-point mooring mechanisms had been installed to load oil onto ships offshore, away from decrepit terminals. A pipeline had been completed and pumps repaired to move more oil. Company payments were still not perfect, but they started to flow more quickly and flexibly in either cash or oil. Those changes opened the door to production increases as energy companies brought old fields back to production. Iraq benefited as it filled a new market niche: customers seeking to diversify to reduce oil imports from Iran.

In most markets, diversification is a core strategy to reduce risk. Less is at stake in any given investment, reducing potential losses from nonperforming assets. Since the 1973 Arab oil embargo, global oil production has diversified, from OPEC accounting for 51 percent of global supply to 43 percent in 2013.[41] Such diversification would seem to hedge against risk, yet it also introduces dependence on new actors that could be sources of disruption. Figure 5 shows us global oil market disruptions from January 2011 to May 2014. Some of those disruptions, like sanctions on Iran, were intended. Others, like Syria and Sudan, are linked to war. Some are due to planned maintenance. Others stem from a mix of corruption and theft, like in Nigeria. Three examples of the impact of disrupted supply and price are illuminating.

Figure 5: Unplanned global oil supply disruptions




Source: IEA World Energy Outlook 2013.

First take the Libyan civil war in February 2011. Conflict took 1.5 million b/d off the market and prices rose from about $95 to $123/barrel in weeks. By May, Saudi Arabia would inject an additional 1 million b/d into global supply and begin to reverse the price hike. IEA countries orchestrated a global release of 60 million barrels in strategic reserves over June and July, further dampening the market.

Next, take the start of Iran sanctions in January 2012. Even though EU sanctions would be phased in from January to June 2012, importers feared the risk of being the last in the market to find new suppliers. The immediate rush for new supplies pushed prices up from $110/barrel in January to $125 in March until new supply relationships were established. Unpredicted in January 2012 were two critical parallel developments: the United States began an unprecedented sprint that added 1 million b/d in 2012, and Saudi Arabia tapped its spare capacity to fill gaps in global supply. The price of Brent crude started and ended in 2012 at about $109 per barrel.[42]

The third case is a second disruption in Libyan supplies in the summer of 2013 that, once again, took almost 1.5 million b/d off the market—but, in contrast to 2011, had little price impact. As Libyan supply diminished, Saudi production increased to 10.1 million barrels per day in September 2013 from 9.6 million b/d in June 2013.[43]

Three lessons stand out.

- The first is the importance of Saudi Arabia. No other country in the world has its capacity in spare production—i.e., the ability to increase production in thirty days and sustain it for ninety days. Keeping oil fields ready but not operational is expensive.[44] The difference between the two Libyan cases is striking, and the main immediate cause was the Saudi response.

- Second, the underlying supply and demand balances matter. After the start of sanctions against Iran, supply/demand balances brought down oil prices after the March 2012 surge. As the United States better understood changing market patterns in 2012, sharing these assessments with other countries became a critical tool in getting other nations to reduce oil imports from Iran. From the outset, Europe was a partner in developing and implementing energy sanctions on Iran. Yet, for others

like China, India, and Turkey, the turning point in cooperation came when they could see that they could diversify supply and reduce risk from dependence on Iran, while at the same time eliminating the threat of sanctions.

- Third, coordinated international stock releases can be an important tool to dampen market risk. The 2011 release coordinated through the IEA played a definitive role in stabilizing markets after the Libyan civil war, yet such releases are not easy to orchestrate. In 2011, it took four months for IEA countries to act. As China, India, and other emerging economies become bigger consumers, they need to become a formal part of coordinated emergency responses to make them effective.

Cutting across these lessons is the emerging importance of energy geopolitics for successful foreign policy. Sanctions on Iran could not have been implemented successfully without engaging importers of Iranian oil to understand why diversification of supply was in their interest and possible under prevailing market conditions. Engaging energy companies and the Iraqi government was fundamental to helping Iraq boost its production in 2012. Geopolitical assessments of Libya in 2013 reinforced that no outside actor had the capacity to mediate and resolve the internal ethnic crisis that blocked oil exports, placing greater importance on Saudi Arabia's role to stabilize the market. In contrast to perceptions that American energy abundance could be a recipe for isolation, the real lessons are that oil markets have become more complex and potentially more volatile, that the United States and other countries have a stake in the outcomes because they affect global prices, and that we need to build greater and more sophisticated capacity for engagement to advance our interests instead of withdraw.

Look again at Iraq, ISIS, Syria, and Turkey. The motivation for ISIS support in western Iraq is Sunni disillusionment during Prime Minister Maliki's government. Sunnis were increasingly excluded from power and realized few benefits from oil wealth; therefore, ISIS was welcomed in many Sunni communities. In mid-2014, prior to the global oil price collapse, ISIS funded itself by stealing and marketing about 47,000 b/d, giving it a cash flow (with price discounts) estimated at $0.8–1.6 million daily.[45] Borders to Turkey need to be closed to cut ISIS off from markets that enable it to expand and consolidate gains. In the south, Iraqi oil production has not reached its full potential, again because of infrastructure, technical and administrative issues, and most fundamentally the need to change contract terms with international companies to make it possible to move from oil field rehabilitation to massive investments in new production. Baghdad has to succeed in these changes to convince the Sunnis that it will have sufficient oil wealth to reallocate to others. In the Kurdistan Region, the ongoing march toward oil development, especially if the area controls oil flows from Kirkuk, will reignite separatist flames if Baghdad and the Kurdistan Region cannot translate their transitional arrangements on oil exports into a durable legal arrangement that incorporates oil from the Kurdistan Region into a national export strategy while providing the latter with an assured share of oil revenues from its production.

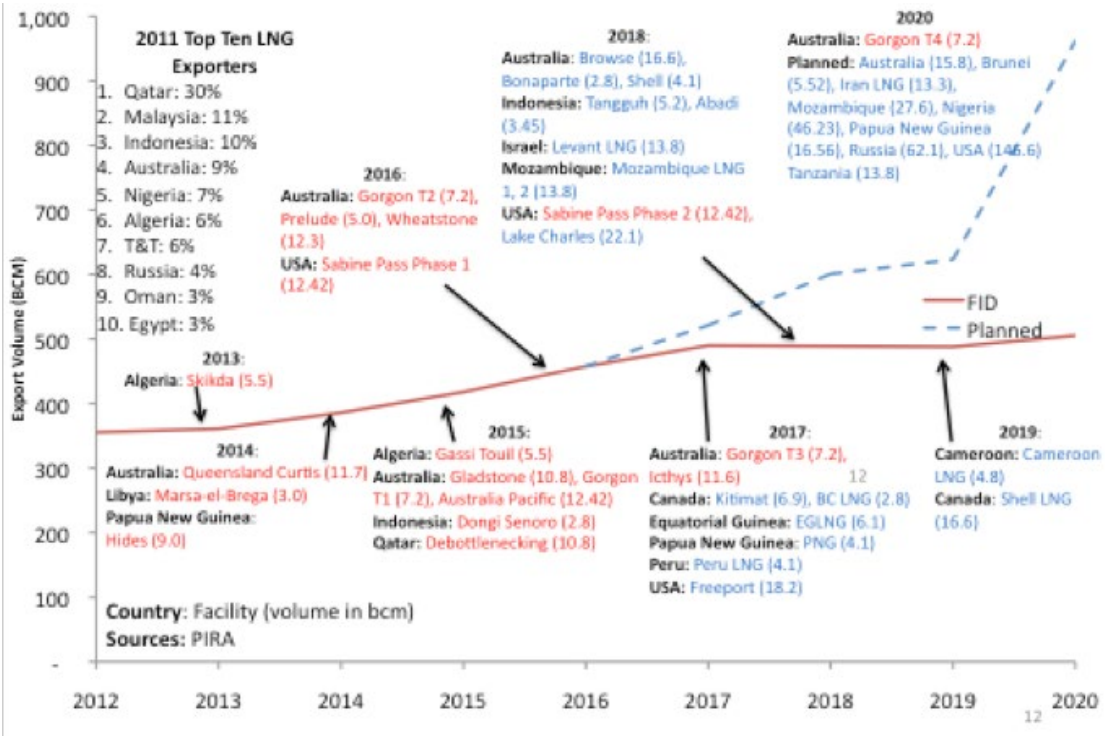
Oil is at the heart of every aspect of Iraq's ability to contain ISIS and survive as a state. For American diplomats to help Iraq succeed as a nation and bring stability to the region, they must understand the roles that oil plays among the key actors, work with Iraq on solutions that create market incentives for a unified state and create the economic conditions to roll back separatist and terrorist influences. For global markets, this matters. The IEA estimates that Iraq could add more oil to global markets by 2030 than any other country. For the Iraqi people, this matters—it is the difference between oil as a source of division to a driver of stability. For the United States, this ability to integrate oil and geopolitical interests may be the strongest tool to help Iraq emerge from its crisis of 2014–2015 as a unified state.

## GAS GOES GLOBAL

In May 2013, I met with Igor Sechin, CEO of the Russian oil giant Rosneft, at Moscow's Vonukovo airport. Sechin arrived late from a business trip and moved our lunch to midnight. Despite the late hour, we spent more than two hours poring over charts that illustrated shifts in global gas markets. The United States, Australia, and Canada could—by 2020—add three times the amount of LNG today produced by Qatar, the world's largest LNG supplier. New supplies would come from Israel, Mozambique, and Tanzania. Nigeria, meanwhile, had vast untapped potential, and we still had little sense regarding the gas potential in pre-salt fields off Brazil and the west coast of Africa. The prime target for these supplies would be Asia, the region with the world's fastest-growing gas demand. I asked Sechin how Gazprom could have invested virtually all of its export capacity into Europe (220 bcm in pipeline capacity) while building only 14 bcm in export capacity to Asia. Sechin was frank: Gazprom got it wrong and mismanaged Russia's national resources, and for that reason he would seek to create competition to export LNG to Asia.

US reemergence as a global energy supplier began to fundamentally change America's dialogue with Russia on energy issues. Sechin is one of the most powerful figures in Russia. He rarely meets with American officials. What made it possible for me to establish a relationship with him was Russian commercial self-interest: with US gas production increasing by 35 percent in the previous five years, the United States was importing little LNG, and countries like Qatar and Trinidad and Tobago were redirecting supplies to Europe. That competition forced Gazprom to decrease its prices and financing terms to European customers in 2011 and 2012.[46] Sechin saw that American production affects Russian interests, and he made the choice to open a relationship to better understand the implications. What cemented the relationship was a common assessment of Russia's failure in Asian gas markets. In 2014, sanctions on Russia due to Russia's violation of Ukraine's national sovereignty made continuing the relationship with Sechin impossible.

**Figure 6: LNG export capacity growth (In billion cubic meters)**




Source: EIA.

The growth of LNG supplies across the world has begun to take natural gas markets global, breaking the regional pipeline-bound monopolies between a single supplier and consumers. Figure 6 illustrates LNG projects that have reached final investment decisions (in red), and others (in blue) that are likely given the involvement of international investors. This prospect for major injections of gas after 2017 will literally and figuratively make global LNG markets more liquid. This greater liquidity contributed, in some regions, to breaking an exclusive practice of pegging gas prices to oil. Earlier we saw (in Figure 2) that natural gas prices have diverged across regions, but that abundant supplies and a mild summer in 2014 drove gas prices down across regions. Better technology and experience continued to drive US supply so that US Henry Hub prices decreased from $4.68/mmbtu in January 2011 to $2.95/mmbtu in January 2015, despite an estimated 9.50% increase in US consumption between 2011 and 2014.[47] Europe has already shown that the geopolitical implications of competition in gas markets will be huge.

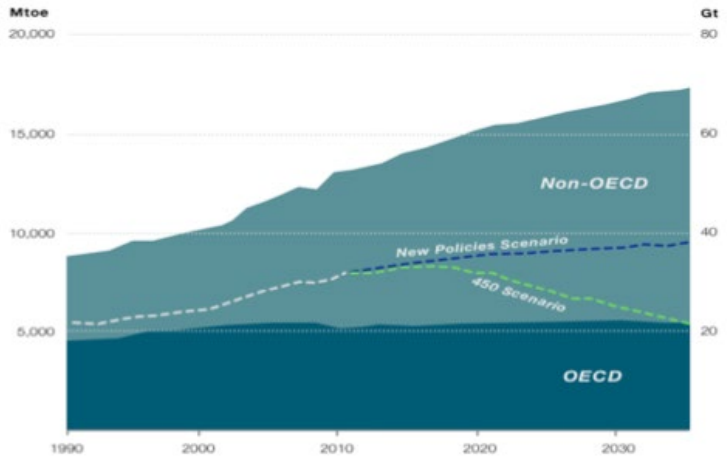
Since the Russia–Ukraine gas war in 2008-2009 that cut off Russian supplies to Ukraine and downstream to Europe for 12 days, Europe has implemented massive changes in regulation and infrastructure. It was simply luck that all this happened in parallel with the American gas supply revolution. Europe, through what is called its third energy package, made it illegal for a single company to own gas supply, the transit pipelines, and the distribution systems. It invested in gas infrastructure to build 177 bcm in regasification terminals and gas interconnectors between states that allowed gas to be traded north–south and west–east. These structural and regulatory changes, combined with new LNG supplies and aggressive gas trade from Norway, forced Russia's Gazprom to compete with other suppliers, and brought consumers lower prices. In 2014, despite Russia again cutting gas supply to Ukraine, Europe entered into the winter with its gas storage systems full and prices low. To be sure, good weather was a factor. Europe's gas system still needs to be extended to give more alternatives to Bulgaria, the Baltics, Finland, and the Balkans; nevertheless, the basic foundations for a competitive gas supply system are now in place. In contrast to 2008, when the Russia–Ukraine gas wars caused a crisis in Europe, today Europe has alternatives. In large part, getting Russia and Ukraine to trade gas in accordance with the principles of the European gas market helped the EU broker an agreement on October 30, 2014 to renew Russian gas sales to Ukraine.

Asian countries now look at the lessons from Europe and grapple with creating a competitive gas system in Asia. Although Asia has no government body like the EU to create the rules, some lessons are clear. There needs to be investment in regasification terminals, storage, pipeline, and shipping vessels to make a physical market viable. Countries must address market rules such as third party access to pipelines and storage terminals, the removal of destination clauses that limit the onward trade of gas, and the decoupling of companies that trade gas, operate pipelines, and distribute gas to consumers. Financial markets must develop to facilitate commodity trade, and data are needed to allow market players to make informed decisions. If countries in Asia take these measures, then they can welcome Russian gas into Asia because it will contribute to creating a competitive market and avoid entrenching Asia in the grip of one supplier.

## GETTING POWER INVESTMENT AND CLIMATE IMPACTS ON THE GEOPOLITICAL AGENDA

The US Embassy in Beijing started a particulate monitoring system so that Embassy personnel would know when to take extra health precautions, and to justify investing in air quality improvements for Embassy housing. When the US Embassy began posting these readings on the Internet, it caused a political stir. Widespread Chinese popular reaction to the information forced the Chinese government to embrace, rather than denounce, the principle of monitoring. Initially, municipalities took their own readings in an effort to follow in the Embassy's footsteps; today, China's federal government sets limits on particulate matter and monitors compliance as a core part of its strategy to combat pollution in urban areas.

**Figure 7: Primary energy demand and related CO2 emissions in IEA New Policies Scenario**

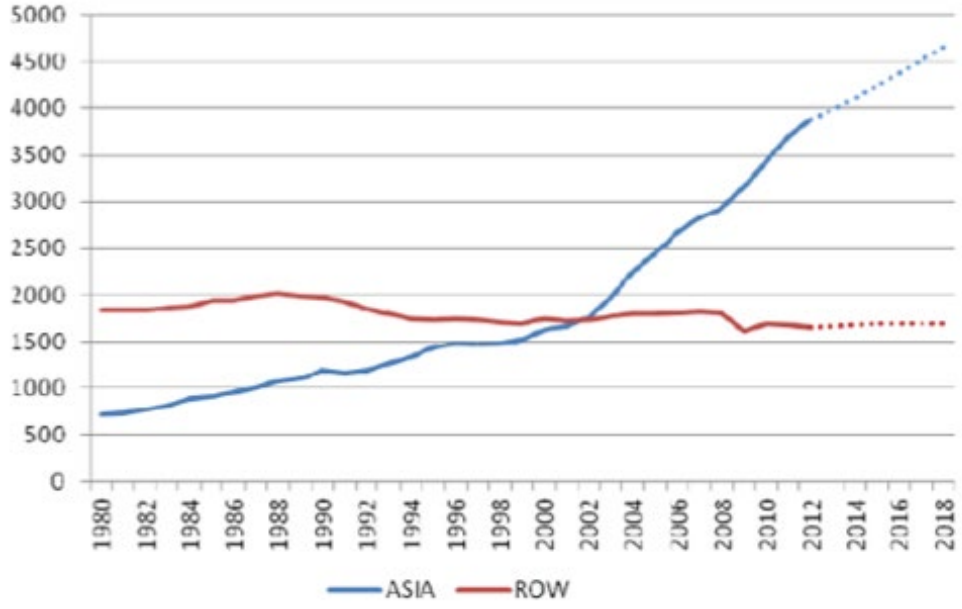



Source: IEA World Energy Outlook 2013.

Between 2014 and 2035, the IEA estimates that, globally, there will be $16.4 trillion in power sector investments. About $9.5 trillion of this will be in power generation.[48] The nature of these investments—whether for renewable energy, clean fuels, or coal—will determine whether globally all nations can succeed in combating climate change. Figure 7 demonstrates that we are failing, and that success must entail radical change from both OECD and non-OECD countries. The Intergovernmental Panel on Climate Change (IPCC), the world's authoritative body on climate science, has determined that, to avoid the most cataclysmic effects of climate change, global CO2 concentrations must remain below 450 parts per million (ppm); by March 2015, we had already exceeded 400 ppm.[49] If countries continue on a business-as-usual path, CO2 emissions will be more than triple than the IPCC's global limit. Figure 7 also shows that if all nations implement "new policies"—roughly the types of policies the United States and Europe have announced to date to curtail climate change, we still exceed our global carbon budget by almost two times. How nations share the world's available carbon budget is a new geopolitical battle. Unless all nations radically alter their path of emissions, we cannot succeed.

To change course, countries must change the way we invest in energy…and do it quickly. In China, fighting pollution will win public political support, but the drive to curtail pollution has not always meshed well with concerns over economic competitiveness and energy security. Although China invests over $60 billion each year in renewable energy, more than any other country in the world, it still consumes 50 percent of the world's coal, and its volume of coal consumed is growing.[50] Figure 8 shows the overwhelming trend toward coal demand in Asia. Even when prices of solar and wind power are competitive with coal and gas, the transition to clean and renewable energy is not proceeding rapidly enough. If nations see stopping climate change as a key foreign policy and national security concern, then the financial and technical factors driving these investment trends must become a priority at the intersection of energy markets and geopolitical interests.

**Figure 8: Global growth in coal demand dominated by Asia**
**(In million tons of oil equivalent)**

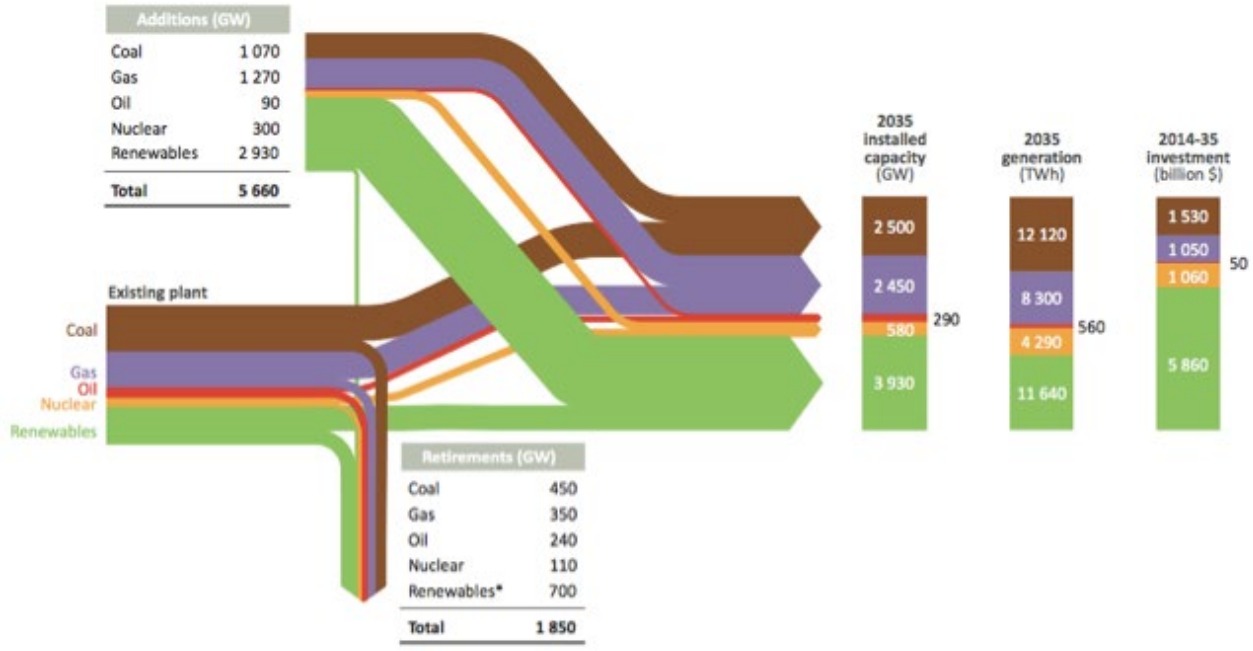



Source: IEA Medium Term Coal Report 2013.

Two points are fundamental. First, every emerging economy wants to ensure it provides power to create jobs, sustain economic growth, and increase access to health care and education. When faced with tradeoffs between power access and the environment, the record has been to invest in the cheapest source of power. Second, energy developers and financial institutions do not invest in power projects because they deliver electricity at a competitive price, although that is a consideration. They invest in projects that deliver the best rate of return, and the trend still does not favor renewables.

Figure 9, based on the implementation of "new policies" as explained above, helps us understand the apparent conundrum between the increased investment in renewable energy and the predominant power generation from coal and other fossil fuels. The IEA estimates that, from 2014–2035, the world will invest more in renewable power capacity than any other form of power generation. However, solar and wind investments typically generate power between 20–30 percent of the time, depending on the country and the quality of the resource. When this "capacity factor" translates into actual power generation, while taking into account existing power plants, coal is still the leading source of global power generation. Despite 60 percent of investment going into solar, wind, and hydro, coal is the largest source of power, and fossil fuels continue to account for 57 percent of power generation. Combine this technical reality with trends toward coal use in Asia (Figure 8) and exceeding the IPCC's global carbon budget (Figure 7), we can see the geopolitical battles that will underpin climate negotiations. As much as developing nations might want to attribute blame to industrialized nations, excluding the developing world from the solution guarantees failure. The current path of transition to renewable technologies does not realize the outcomes we need. Developing countries demand growth and access to power. Our collective future rests heavily on the economics of clean energy power investments.

Figure 9: Power sector capacity, generation and investment flows 2014-2035




Source: IEA World Energy Investment Outlook 2014.

A straightforward answer would be to place a price on carbon to pay for externalities ranging from environmental destruction to poor health from CO2 emissions. In the United States, there is no political will to pass such federal legislation; meanwhile, the European experiment with a carbon market has not produced a price on carbon serious enough to change investment patterns, and the same is true with the nascent Chinese experiment to put a price on carbon. Until a different situation arises, investments in renewable energy will compete against a cost for coal power that does not reflect its damage to our civilization. Perhaps future global climate change negotiations will rectify this problem; but, until that occurs, the alternative to inaction is to find other ways to intervene in the balance sheets of power investments' benefit/cost analyses to alter the outcomes. For example, if wind and power are available only 20–30 percent of the time and this vastly hurts the benefit stream in the calculations, are there ways to alter other parts of the balance sheet, such as lowering the cost of capital? Can investment in research and development reduce the intermittency of renewables, and thus increase the analysis's confidence in the benefit stream? These are immediately actionable challenges.

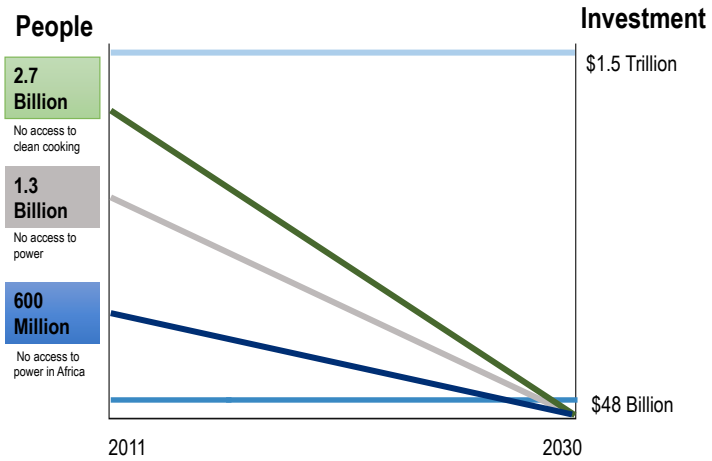
Perhaps these details seem overly technical for senior foreign policy and national security officials. They are not. Throughout the Cold War, our senior officials had to learn the details of nuclear weapons, throw weights and ballistic missiles. The United States made the investment because the security of the world depended on it. The same is true today for climate change. To succeed, we must integrate finance experts, energy developers, engineers, climate scientists and foreign policy specialists into the debate. No nation can, in 2015, seriously claim it is solving these issues with such an integrated approach. Without it, minds cannot meet on solutions that unite scientific imperative with economic and political realities.

## GETTING ENERGY TO THE POOR

The tension between energy access and climate has been particularly acute among African nations. While Africa is deeply affected by climate change, from increased desertification to coastal flooding, it also is the continent with the least access to power. Across the continent, most countries—with the exceptions of South Africa and Nigeria—can get power to about 20 percent of their populations. Access to energy has become, for them, key to economic growth, competitiveness, job creation, and expanding opportunities for health care and education. When the UN and World Bank formally launched the global Sustainable Energy for All Initiative (SE4All) in 2012, it won the endorsement of African nations only because of the diplomatic skill of SE4All's CEO, Kandeh Yumkella. For many in Africa, SE4All was first viewed as a western attempt to entrap developing countries into what they saw as a western agenda on climate change. Yumkella's tireless engagement at the UN and travel to the region convinced African heads of state that SE4All's goals on energy efficiency and renewable energy would not outweigh a commitment to achieving universal energy access by 2030. Now the challenge is to get access, efficiency, and renewable power to advance together.

The World Bank estimates that there are 1.2 billion people without access to electricity globally; 600 million of these are in Africa, and another 300 million are in India.[51] Moreover another 2.7 billion people worldwide subsist without access to clean cooking facilities, estimated to be the fourth worst risk factor for disease in developing countries, and the cause of four million premature deaths globally per year—exceeding deaths attributable to malaria or tuberculosis.[52] Figure 10 illustrates that ensuring all people have access to electricity and clean cooking facilities worldwide by 2030 will require $48 billion in investments annually—with a current base of $9 billion.[53] If we define the goal of universal energy access as a development aid challenge, we will fail. If we frame it as attracting private capital, it means diverting about 3 percent of annual global energy investments in power systems. There, we have a chance to succeed.

Figure 10: Required investments for energy access




Source: IEA.

Meeting the challenge of universal access depends more on business models than technical solutions. Technical progress has reduced the cost of solar and wind power until it is comparable to coal and gas, even if wind and solar projects are hampered by problems of intermittency. Consider the comparative business case between small-scale renewables and diesel power. The Caribbean states have an average price of electricity close to 35 cents per kilowatt hour (kwh), largely because they rely on diesel as a fuel.[54] Wind and solar solutions are well within the range of 20 cents/kwh. But, to make them viable, businesses have to secure loans to finance the up-front capital costs, and few businesses or Caribbean governments can secure competitive terms to amortize the investment costs. In Nigeria, the cost of diesel-generated power can be as high as 50 cents/kwh, yet the country is awash in natural gas, which could produce power at 9 cents/kwh.[55, 56] Nigeria's problem is not technical; it requires cutting through corruption to ensure that gas distribution lines connect gas fields with power generators, and ensuring that utilities that distribute power can cut losses that might range from 50 to 70 percent of the power they produce. No business in any sector can operate if potential revenues are lost on such a scale.

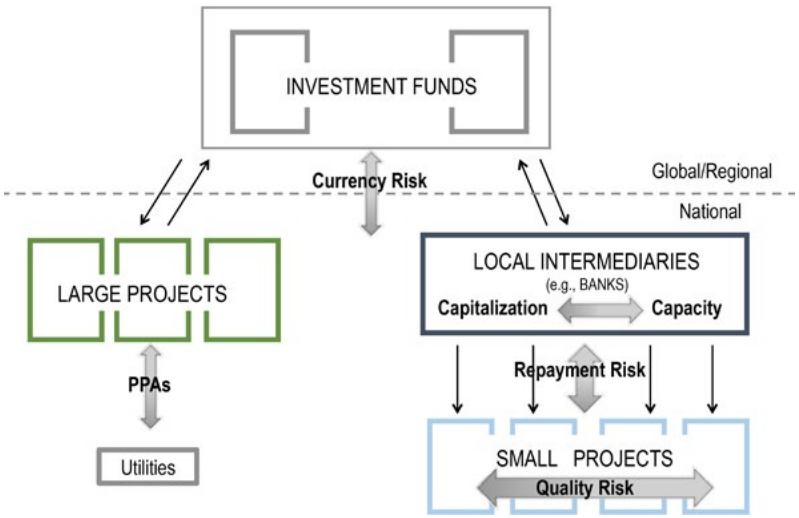
In this context, consider the comparative institutional and risk factors for any large-scale power investments. In April 2014, on the margins of the Bloomberg New Energy Finance's annual summit on clean energy innovation and finance, one private equity manager explained it this way:

> If I invest in a 300 MW power plant in Texas, I can get on-line, hour-by-hour information on performance. If there is a problem, I know whom to call to resolve it. It takes me 30 minutes a week to manage this project. In a developing country, I have no confidence in the data, I don't trust the information I get on the phone, and you can't rely on getting access to the key decision makers. The amount of time I could invest might be infinite in relative terms. And I have more than enough good projects in North America and Europe.

Perhaps this anecdote does not reflect universal truth, but it makes clear that projects in developing markets have to overcome vast institutional risks, and investors are not short on alternatives.

Issues with off-grid power are even greater. Figure 11 illustrates the difference. For larger scale investments, even in light of deep institutional constraints, there are established tools to reduce political and commercial risk. In developing countries, the size of optimal off-grid investments is so small, perhaps in the range of 10 kw per village, that international actors have difficulty considering such investments individually. If projects are aggregated, then there is a need for a reliable intermediary, and then intermediaries face the risk of reliable technologies and solvent end users. Take the case of India to illustrate the management challenge. About 69 percent (about 833.1 million) of Indians live in 640,867 different villages—about an average size of 1,500 per village. With an average village size of 1,500 people, and an optimal project size of 10 kw per village, that means repeating these types of projects 100,000 times to add 1,000 MW of capacity. No international donor can manage so many transactions. Even with intermediaries, hundreds could be necessary. While there are many small-scale examples of successful off-grid projects that have been advanced with international support, the business world still lacks the models to massively replicate and scale up such projects.

Figure 11: De-risking energy access




The geopolitical issues entwined in these challenges are potentially explosive. India is the country with the largest number of people with no access to power, yet it is also a democratic country with a rising middle class.[57] That inequality could be a political liability. Switch continents: Nigeria is the country with the most people who lack access to power in Africa.[58] It is also Africa's leader in producing oil and gas. The majority of Nigerians who lack access to power are in the northeast and in the coastal Delta area, two areas of Nigeria wracked with insurgencies that could threaten the cohesiveness of the state. Until the Ebola crisis, Africa had eight of the twenty fastest-growing countries in the world. New oil and gas finds on Africa's west and east coasts are

of an international scale. The potential for growth is huge, but not if industry cannot operate with reliable power supplies, and not if governments do not translate natural resource wealth into benefits for their populations. It is this mix—of potential for economic success and political disillusionment—that puts the issue of energy access on the map of global geopolitical priorities.

# CONCLUSION

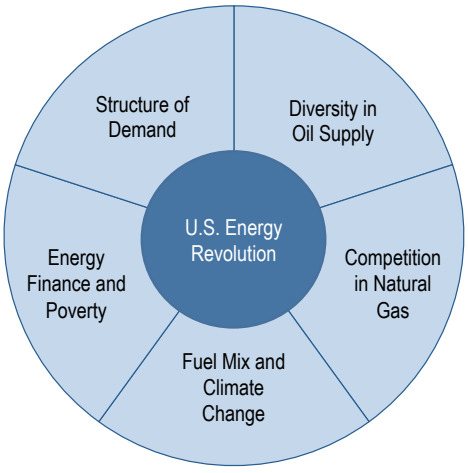
Let us return to the world of American energy abundance. It is a revolution that has stimulated American economic growth. The switch to natural gas from coal helps reduce CO2 emissions as long as methane emissions are kept in check. Natural gas offers an alternative to integrate with renewable energy as a flexible base load fuel that could bridge to a lower-carbon economy. American supplies are contributing to making global natural gas and oil markets more competitive. That trend can continue as oil and gas production become increasingly diversified globally. These are positive foundations to advance energy security and sustainability.

Isolationism is not a strategy to succeed in navigating energy markets to serve American national security interests. Politically and economically, the United States has a stake in the stability of global oil and gas markets. Prices are increasingly global; and, even if we can escape interruptions in supply, we cannot isolate ourselves from price vulnerabilities that directly affect the American economy. Politically and environmentally, the United States has a stake in seeing global energy investments that drive global energy use to sustainable solutions. Isolating the United States will not only make it harder to solve climate change; it will also undermine American competitiveness in a global power market that the IEA estimates at $16.5 trillion in the next twenty years. In some cases the United States, or other energy producers, might consider intervening in energy markets for specific geopolitical ends. The "Rules of Six" outlined earlier set a framework that helps us understand when and how such interventions could succeed. However, the Rules of Six also remind us that market realities will limit the ambitions of geopolitically driven interventions.

Figure 12 captures a new reality of the geopolitics of energy: to serve American national security interests, the United States must go beyond understanding how the American energy market affects global change to also understanding how changes in global energy markets affect the United States. That means understanding the shifts in global energy demand to new actors outside the OECD, the diversification of oil supplies across countries with instability and risk that can disrupt international markets, the growing competition in global gas markets that can be a source for energy security, the incentives for power investment across nations and the implications for climate change, and the thirst for energy access and the consequences if countries cannot meet public expectations.

No country can escape the complicated intersection of energy geopolitics and national security, but for the United States there is a unique challenge – and an opportunity. Resource abundance gives the United States the chance to address the dynamics of a changing energy world in ways that can make nations more secure, our economies more prosperous, and the planet more sustainable. That said, we will succeed only through diplomatic engagement aligned with commercial reality and technological innovation. Today, the United States must invest in the human capacity to manage these issues on the scale that the United States once assigned to avoiding nuclear war. Energy has become an existential issue of equal consequence.

**Figure 12: Dynamic global energy landscape**



# NOTES

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